

Traffic Calming Examples

5th Street NE Bicycle Boulevard - Alternatives Matrix

MAP ID No.	Intersection	Alternatives	Estimated Quantities (L/S or EA)	Unit Cost	Total Cost	Percent of Construction Budget	Exhibit	Comments
<b>Bicycle Boulevard Basic Elements</b>								
A		Pavement Markings	25	\$300	\$7,500	4%	As Shown	
B		Route Marker Signs	27	\$150	\$4,050	2%	As Shown	
C		Advanced Identity Signs	4	\$250	\$1,000	1%	As Shown	
D		Wayfinding / Destination Signs	17	\$250	\$4,250	2%	As Shown	
E		Modified Street Name Signs	50	\$125	\$6,250	3%	As Shown	
		Education and Promotion	1	\$1,500	\$1,500	1%	-	
					<b>\$24,550</b>	<b>13%</b>		
<b>Bicycle Boulevard Corridor Elements</b>								
<b>Intersection Treatments and Spot Improvement Alternatives</b>								
1	University Avenue NE / 27th Avenue NE to Alley	Alt A: Widen Sidewalk to 10 feet and Mark as Shared Use Path Alt B: Construct 10' Bicycle Adjacent to Sidewalk (Maintain Trees as Blvd between Paths) Alt C: Do Nothing (Bikes use sidewalk)	1	\$17,200	\$17,200	9%	1A 1B	Remove and Install 7 trees ROW/Property Lines Unknown
2	University Avenue NE / 26th Avenue NE Connection	Alt A: Use Existing Alley (Resurface Bituminous on North End) Alt B: Construct 10' Bicycle Path adjacent to Alley Alt C: Do Nothing (Route Bikes to Use Sidewalk on University Avenue)	1	\$26,700	\$26,700	12%	2A 2B	ROW/Property Lines Unknown
3	5th Avenue NE / 4th Street NE	Alt A: Construct Bicycle Pass-Thru in Existing Driveway Alt B: Sidewalk Connections University Avenue to 4th Street NE	1	\$9,100	\$9,100	5%	3A	Remove Large Tree and Reconstruct Retaining Wall
4	5th Street NE / Lowry Avenue NE	Alt A: Do Nothing Alt B: Install Traffic Signal Alt C: Install Overhead Flasher	1	\$150,000	\$150,000	82%	-	
5	5th Street NE / 22nd Avenue NE	Alt A: Realign 5th Street NE to Narrow Intersection (Remove All-way Stop). Stop Northbound/Southbound Traffic Alt B: Acceptable Intersection Narrowing through Markings, Detour, Landscape Pits (Remove All-way Community to Use Excess Pavement (e.g., potted plants, etc.)) Alt C: Do Nothing	1	\$49,000	\$49,000	27%	5A 5B	
6	5th Street NE / 18th Avenue NE	Alt A: Do Nothing Alt B: Landscaped Area with Bench and Kiosk (Coordinate with 18th Avenue Trail) Alt C: B Refuge Median (Remove 1 Eastbound Lane) - Prohibit Left Turns	1	\$40,000	\$40,000	22%	6B 7A	Require ROW
7	5th Street NE / Broadway Street NE	Alt A: B Refuge Median (Maintain 4 Lanes, Shift South) - Prohibit Left Turns Alt B: B Refuge Median (Remove 1 Eastbound Lane) - Allow Left Turns Alt C: No Median (Maintain 4 Lanes) - Install Crosswalk and Overhead Flasher System Alt D: Install Traffic Signal Alt E: Provide Bicycle Pass Thru Only	1	\$100,600	\$100,600	55%	7B 7C 7D	
8	5th Street NE (8th Avenue NE to 9th Avenue NE)	Alt A: Install Corridor Flow Bike Lane (East Side) and Showers (West Side) Alt B: Convert to Two-Way Traffic. Sign/Mark as Bike Blvd Alt C: Maintain One-Way. Add Signs to Permit Bicycles in Opposite Direction	1	\$2,100	\$2,100	1%	8A 8B	Remove 1-Side On-Street Parking (East Side) Violates Driver Expectation
9	5th Street NE (8th Avenue NE to 2nd Avenue SE)	Alt A: Install Corridor Bike Lanes and Showers Alt B: Install Showers Only Alt C: Do Nothing	1	\$13,000	\$13,000	7%	9B	Remove 1-Side On-Street Parking (East Side 3rd Avenue to 6th Avenue)
10	5th Street NE (2nd Avenue SE to 8th Avenue SE)	Alt A: Install Showers (Eastbound) Remove One-Way Signs. Install No Left Turn or No Right Turn Signs with "Except Bikes" Plaque on Cross-streets Alt B: No Showers (Eastbound). Install Bicycle Boulevard Pavement Markings Remove One-Way Signs. Install No Left Turn or No Right Turn Signs with "Except Bikes" Plaque on Cross-streets	1	\$19,500	\$19,500	11%	10A	
11	5th Street NE / Central Avenue	Alt A: Install Bicycle Detection (Video, Push Button or Retrolit Existing Sensors Detectors) Alt B: Install Bicycle Detection - Close Median to Motor Vehicles	1	\$6,000	\$6,000	4%	-	
12	5th Street NE / 1st Avenue NE	Alt A: Do Nothing Alt B: Curb Extensions (Narrow 1st Avenue NE)	1	\$0	\$0	0%	-	
13	5th Street NE / 15th Avenue NE	Remove All-way Stop. Install Traffic Circle	1	\$10,900	\$10,900	6%	-	
14	5th Street NE / 17th Avenue NE	Remove All-way Stop. Install Traffic Circle	1	\$10,900	\$10,900	6%	-	
15	5th Street NE / 22nd Avenue NE	Remove all-way at 22nd Avenue NE/4th Street NE. Consider Traffic Circle at 5th Street/22nd Avenue with intersection re-alignment from 5A	1	\$10,900	\$10,900	6%	-	
16	5th Street NE / 18 Avenue NE	Raised Crosswalk (Installed by Others - 18th Avenue Trail Project) Install Speed Bumps Intersection Curb Extensions	1	\$0	\$0	0%	-	
-	To Be Determined (Neighborhood Input)		1	\$5,000	\$5,000	3%	-	
-	To Be Determined (Neighborhood Input)		1	\$40,000	\$40,000	22%	-	
<b>Total Project Cost</b>					<b>\$444,150</b>			
<b>Estimated Project Total (Basic Elements)</b>					<b>\$24,550</b>			
<b>Construction Budget</b>					<b>\$182,620</b>			
<b>Surplus / Deficit</b>					<b>\$158,070</b>			

- Other Bicycle Facility
- Raised Crosswalk (By Others)
- Potential Future Traffic Circle (Remove All-way Stop)
- Existing Traffic Signal
- Typical Pavement Markings**
- A**
- Typical Route Marker Sign**
- B**
- Advanced Identity Signs**
- C**
- Example Destination Sign**
- D**
- Typical Street Name Sign**
- E**

**Speed Bumps**  
Cost Range: Approx. \$5,000 per pair



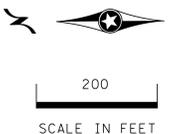
**Curb Extensions**  
Cost Range: Approx. \$40,000 per intersection (may vary widely based on drainage considerations)

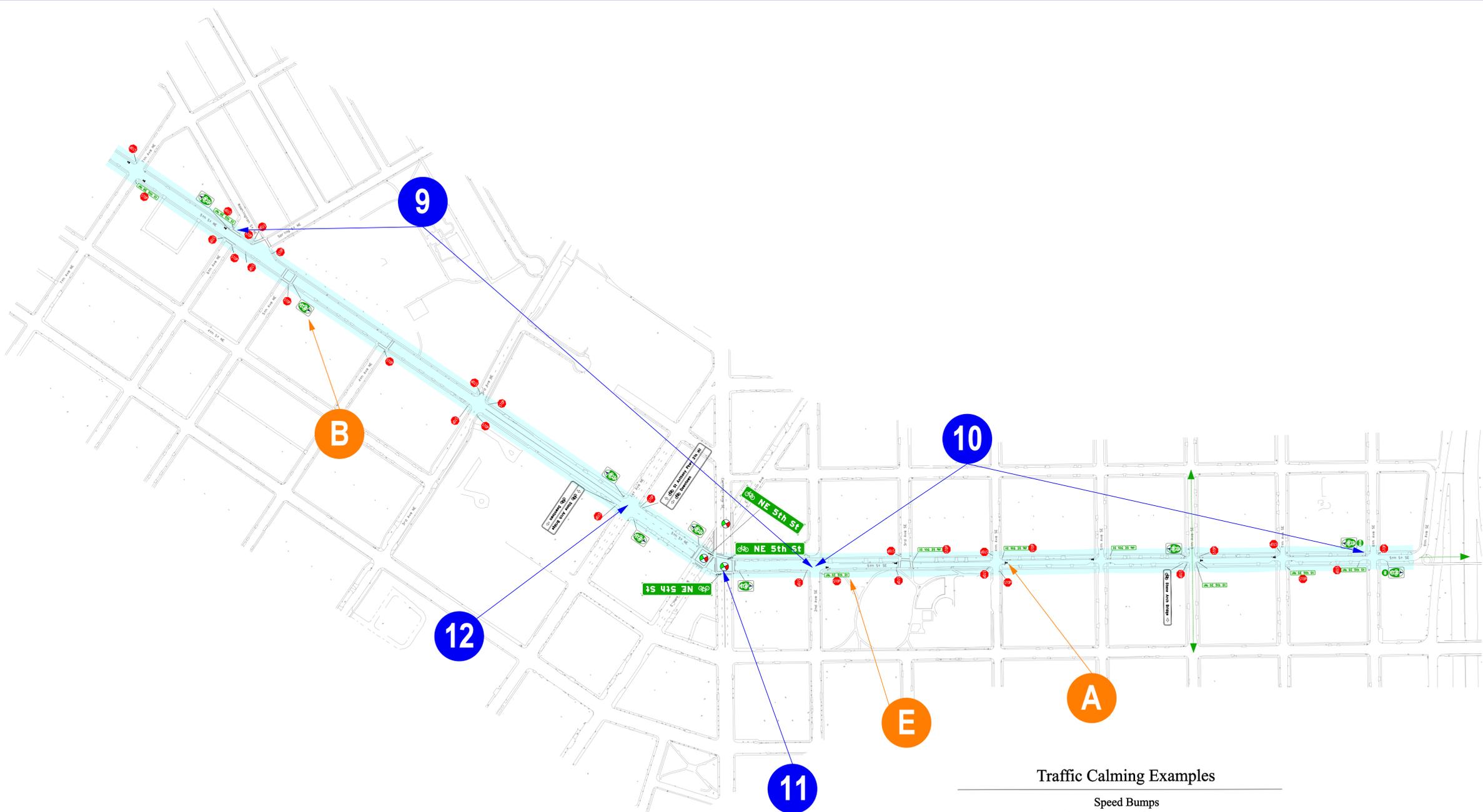


**Traffic Circle**  
Cost Range: Approx. \$6,000 - \$10,000



**Diverter**  
Cost Range: Approx. \$50,000+ (may vary widely by intersection)





5th Street NE Bicycle Boulevard - Alternatives Matrix

MAP ID No.	Intersection	Alternatives	Estimated Quantity (LS or EA)	Unit Cost	Total Cost	Percent of Construction Budget	Exhibit	Comments
<b>Bicycle Boulevard Basic Elements</b>								
A	Pavement Markings	Required	25	\$300	\$7,500	4%	As Shown	
B	Route Marker Signs	Required	27	\$150	\$4,050	2%	As Shown	
C	Advanced Identity Signs	Required	4	\$250	\$1,000	1%	As Shown	
D	Wayfinding / Destination Signs	Required	17	\$250	\$4,250	2%	As Shown	
E	Modified Street Name Signs	Required	50	\$125	\$6,250	3%	As Shown	
	Education and Promotion	Required	1	\$1,500	\$1,500	1%	-	
<b>Bicycle Boulevard Corridor Elements</b>								
<b>Intersection Treatments and Spot Improvement Alternatives</b>								
1	University Avenue NE (7th Avenue NE to Alley)	Alt A: Widen Sidewalk to 10 feet and Mark as Shared Use Path. Alt B: Construct 10' Bicycle Adjacent to Sidewalk (Maintain Trees as Blvd between Paths) Alt C: Do Nothing (Bikes use sidewalk)	1	\$17,200	\$17,200	9%	1A	Remove and Install 7 trees ROW/Property Lines Unknown
2	University Avenue NE / 26th Avenue NE Connection	Alt A: Use Existing Alley (Resurface Bituminous on North End) Alt B: Construct 10' Bicycle Path Adjacent to Alley Alt C: Do Nothing (Bikes use Sidewalk on University Avenue)	1	\$22,800	\$22,800	12%	2A	ROW/Property Lines Unknown
3	26th Avenue NE / 4th Street NE	Alt A: Construct Bicycle Pass-Thru in Existing Channel Alt B: Sidewalk Connections University Avenue to 4th Street NE	1	\$9,100	\$9,100	0%	3A	
4	5th Street NE / Lowry Avenue NE	Alt A: Do Nothing Alt B: Install Traffic Signal Alt C: Install Overhead Flasher	1	\$0	\$0	0%	-	
5	5th Street NE / 22nd Avenue NE	Alt A: Realign 5th Street NE to Narrow Intersection (Remove All-way Stop). Stop Northbound/Southbound Traffic. Alt B: Accomplish Intersection Narrowing through Markings, Delineator, Landscape Pots (Remove All-way) Community to Use Excess Pavement (e.g., potter plants, etc.) Alt C: Do Nothing	1	\$49,900	\$49,900	27%	5A	
6	5th Street NE / 18th Avenue NE	Alt A: Do Nothing Alt B: Landscaped Area with Bench and Kiosk (Coordinate with 18th Avenue Trail) Alt C: Do Nothing	1	\$0	\$0	0%	-	
7	5th Street NE / Broadway Street NE	Alt A: 8' Refuge Median (Remove 1 Eastbound Lane) - Prohibit Left Turns Alt B: 8' Refuge Median (Maintain 4 Lanes, Shift South) - Prohibit Left Turns Alt C: 8' Refuge Median (Remove 1 Eastbound Lane) - Allow Left Turns Alt D: No Median (Maintain 4 Lanes) - Install Crosswalk and Overhead Flasher System Alt E: Install Traffic Signal Alt F: Provide Bicycle Pass Through Only	1	\$34,700	\$34,700	19%	7A	Require ROW
8	5th Street NE (8th Avenue NE to 9th Avenue NE)	Alt A: Install Corner First Bike Lane (East Side) and Sharrow (West Side) Alt B: Convert to Two-Way Traffic, Sign/Mark as Bike Blvd Alt C: Maintain One-Way, Add Signs to Permit Bicycles in Opposite Direction	1	\$2,100	\$2,100	1%	8A	Remove 1-Side On-Street Parking (East Side)
9	5th Street NE (8th Avenue NE to 2nd Avenue SE)	Alt A: Install Combination Bike Lanes and Sharrows Alt B: Install Sharrows Only Alt C: Do Nothing	1	\$13,900	\$13,900	8%	9A	Remove 1-Side On-Street Parking (East Side 3rd Avenue to 6th Avenue)
10	5th Street NE (2nd Avenue SE to 8th Avenue SE)	Alt A: Install Sharrows (Eastbound) Remove One-Way Signs, Install No Left Turn or No Right Turn Signs with "Except Bikes" Plaque on Close Streets Alt B: No Sharrows (Eastbound), Install Bicycle Boulevard Pavement Markings Remove One-Way Signs, Install No Left Turn or No Right Turn Signs with "Except Bikes" Plaque on Close Streets Alt C: Do Nothing	1	\$19,500	\$19,500	11%	10A	
11	5th Street NE / Central Avenue	Alt A: Install Bicycle Detection (Video, Push Button or Retrofit Existing Senecys Detectors) Alt B: Install Bicycle Detection + Close Median to Motor Vehicles	1	\$8,000	\$8,000	4%	-	
12	5th Street NE / 1st Avenue NE	Alt A: Do Nothing Alt B: Curb Extensions (Narrow 1st Avenue NE)	1	\$0	\$0	0%	-	
<b>Traffic Calming Alternatives</b>								
13	5th Street NE / 15th Avenue NE	Remove All-way Stop, Install Traffic Circle	1	\$10,900	\$10,900	6%	-	
14	5th Street NE / 17th Avenue NE	Remove All-way Stop, Install Traffic Circle	1	\$10,900	\$10,900	6%	-	
15	5th Street NE / 22nd Avenue NE	Remove All-way at 22nd Avenue NE/4th Street NE. Consider Traffic Circle at 5th Street/22nd Avenue with intersection realignment Ave SA.	1	\$10,900	\$10,900	6%	-	
16	5th Street NE / 18 Avenue NE	Raised Crosswalk (Installed by Others - 18th Avenue Trail Project) Install Speed Humps Intersection Curb Extensions	1	\$0	\$0	0%	-	
					Total Project Cost*	\$444,190		
					Estimated Project Total (Basic Elements)	\$24,550		
					Construction Budget	\$182,620		
					Surplus / Deficit	\$158,070		

\* Total project cost for information only and provides an estimate of 1 full project build-out scenario. The hypothetical scenario estimate is based upon the selection of the basic elements plus 1A, 2A, 3B, 4A, 5A, 6B, 7D, 8A, 9A, 10A, 11B, 12B, 13B, 14, 15.

Traffic Calming Examples

Speed Bumps

Cost Range: Approx. \$5,000 per pair



Curb Extensions

Cost Range: Approx. \$40,000 per intersection (may vary widely based on drainage considerations)



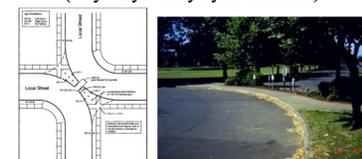
Traffic Circle

Cost Range: Approx. \$6,000 - \$10,000



Diverter

Cost Range: Approx. \$50,000+ (may vary widely by intersection)



Other Bicycle Facility

Potential Future Traffic Circle (Remove All-Way Stop)

Existing Traffic Signal

Typical Pavement Markings



Typical Route Marker Sign



Advanced Identity Signs



Example Destination Sign



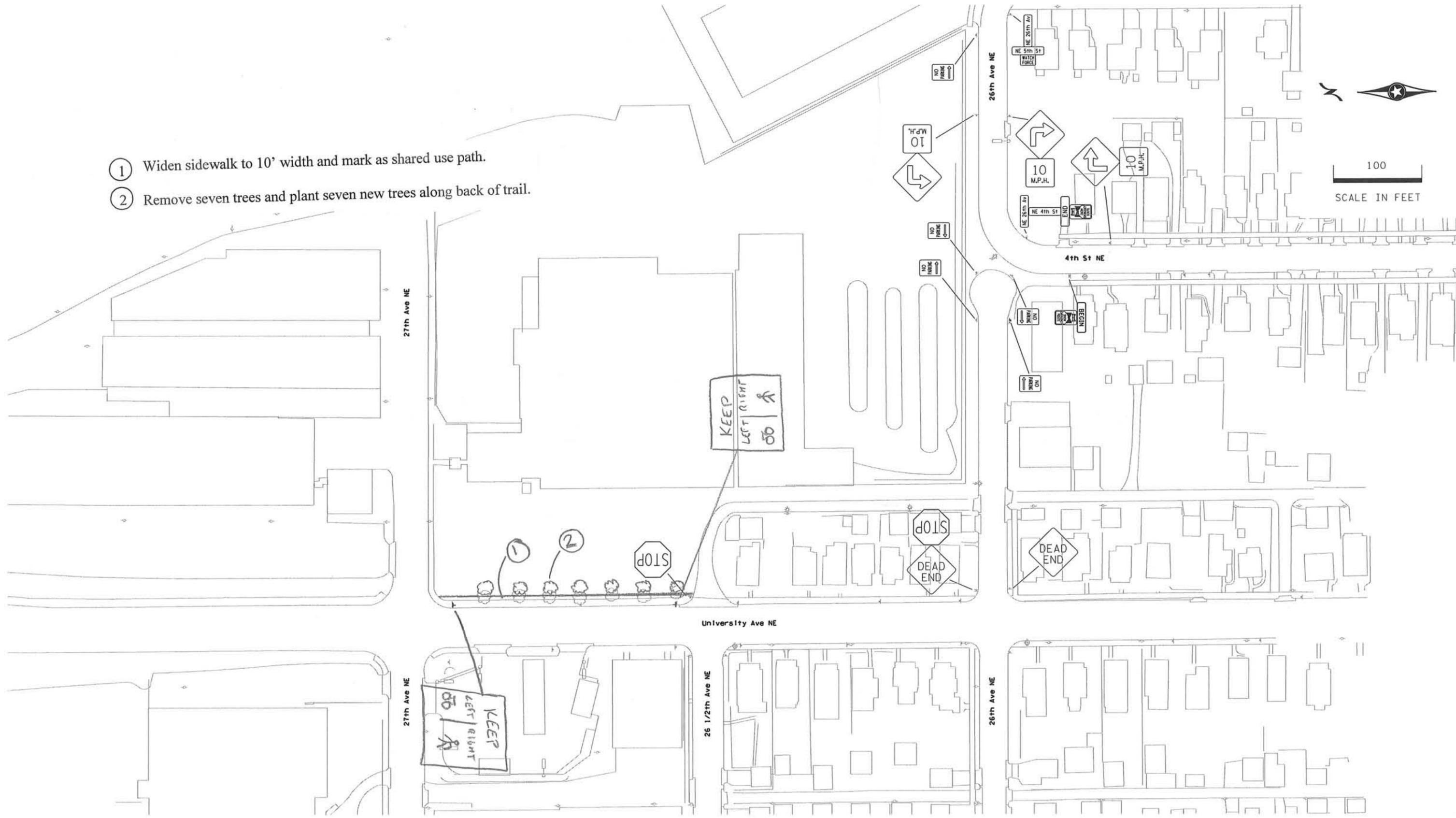
Typical Street Name Sign



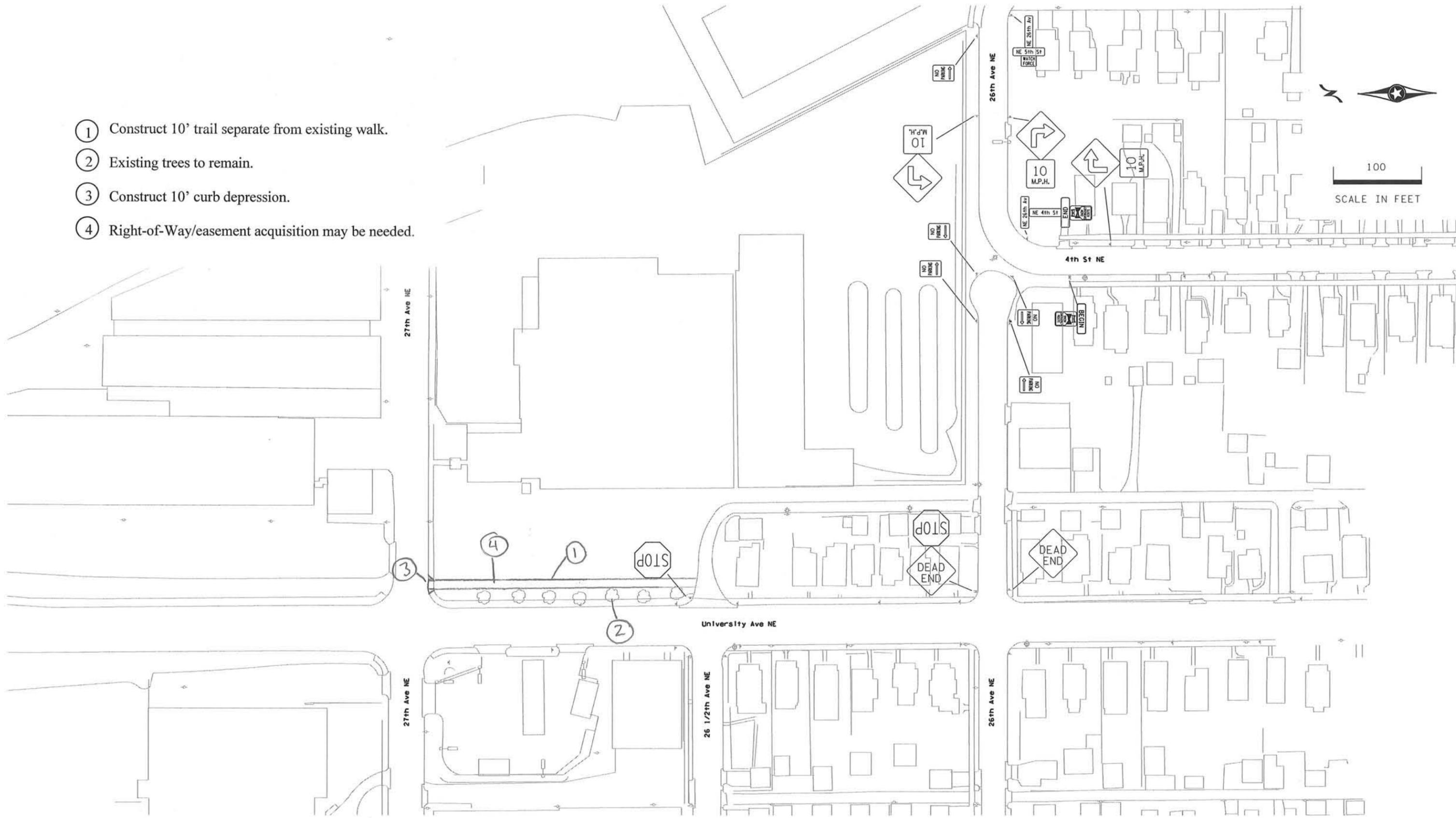
200  
SCALE IN FEET

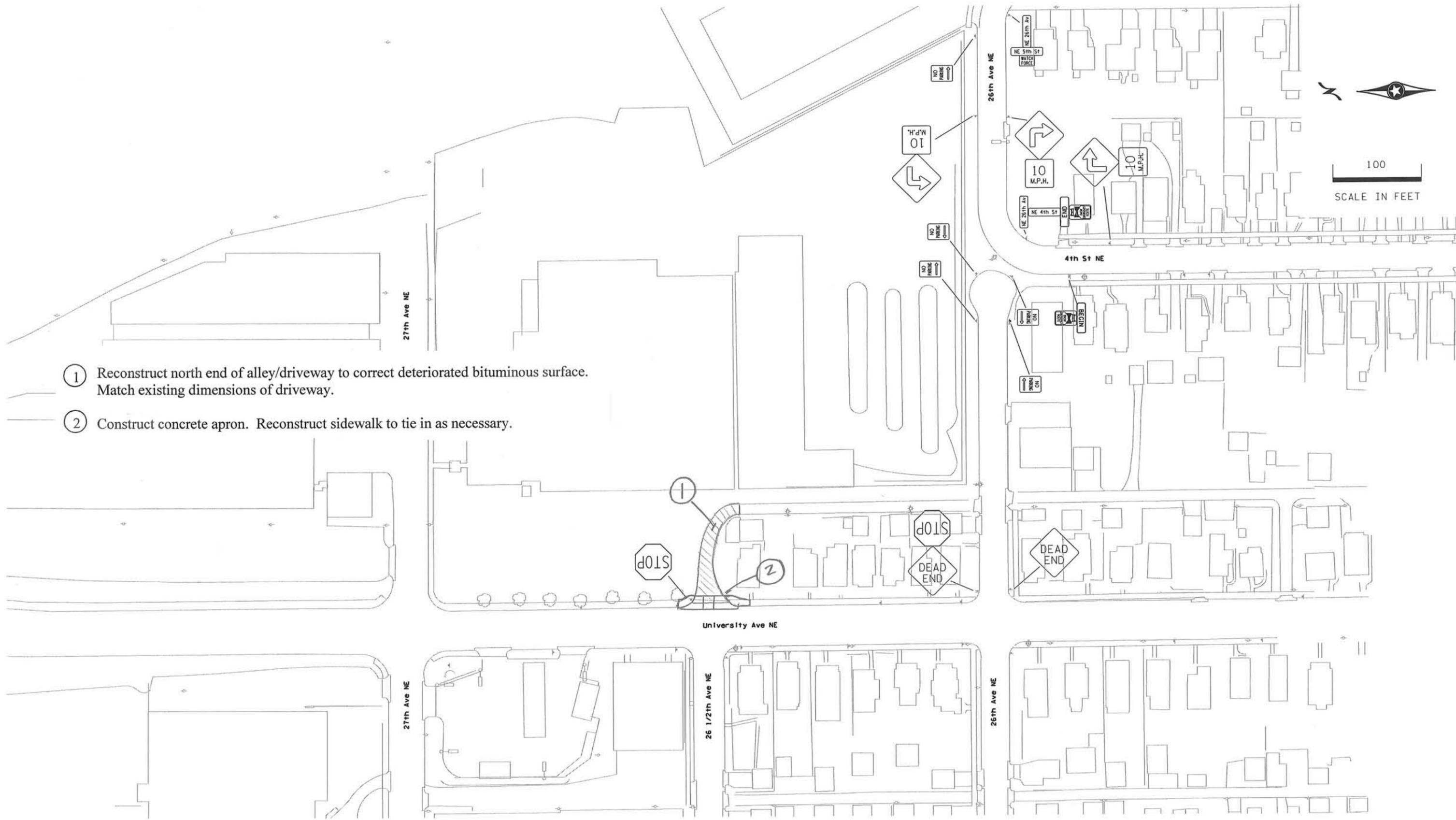
5th Street Bicycle Boulevard (7th Ave NE to 8th Ave SE)

- ① Widen sidewalk to 10' width and mark as shared use path.
- ② Remove seven trees and plant seven new trees along back of trail.



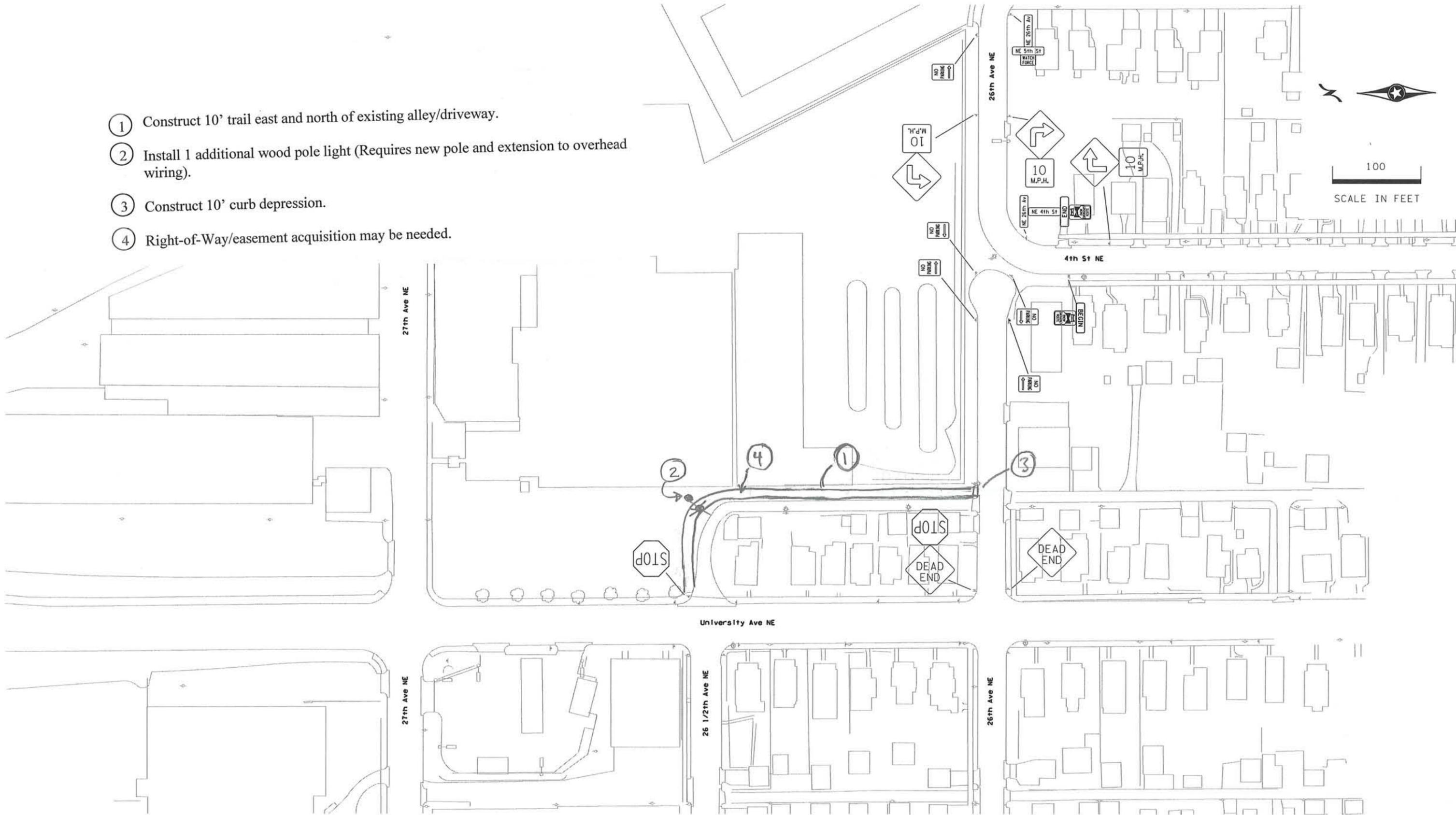
- ① Construct 10' trail separate from existing walk.
- ② Existing trees to remain.
- ③ Construct 10' curb depression.
- ④ Right-of-Way/easement acquisition may be needed.

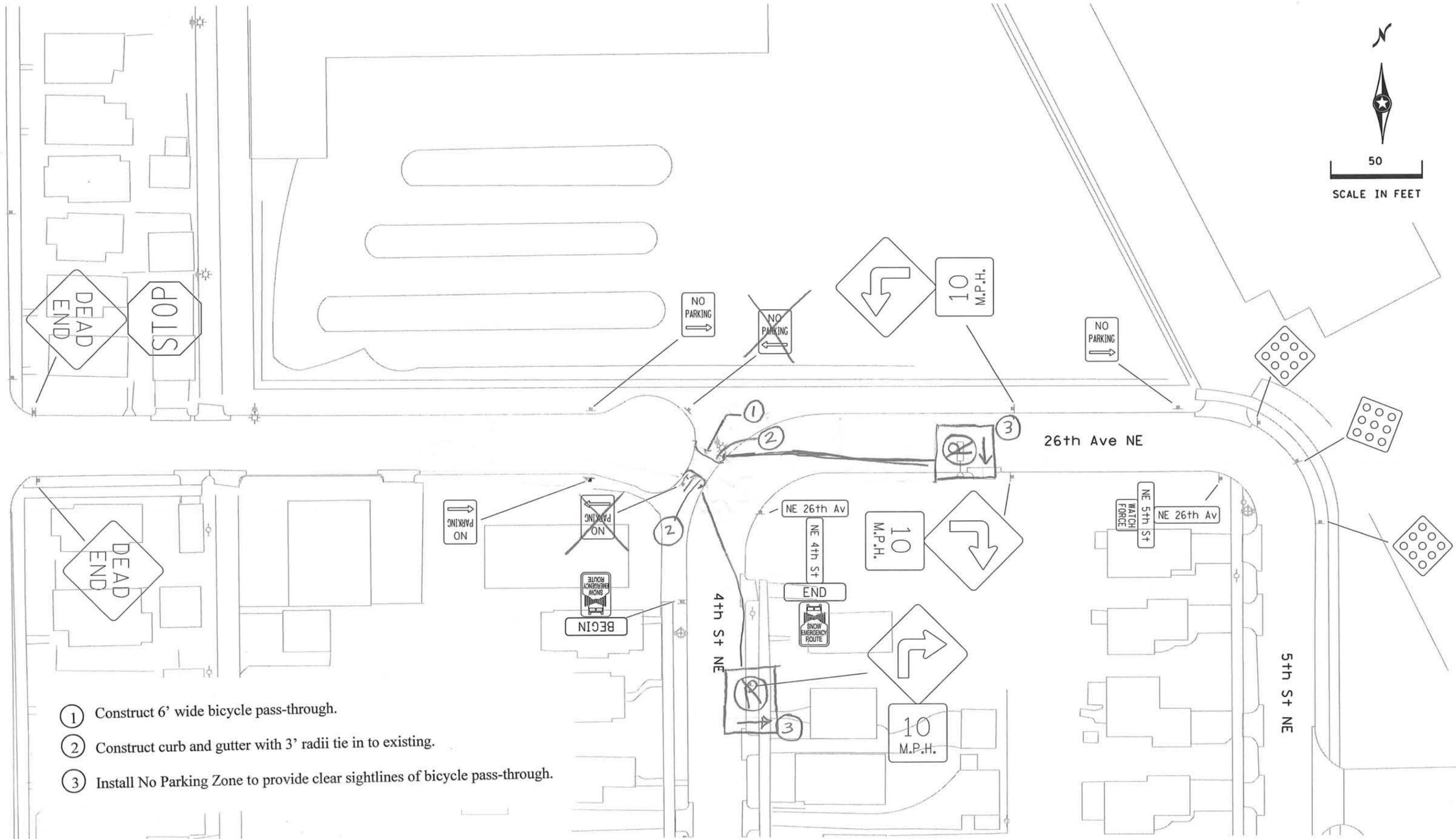




- ① Reconstruct north end of alley/driveway to correct deteriorated bituminous surface. Match existing dimensions of driveway.
- ② Construct concrete apron. Reconstruct sidewalk to tie in as necessary.

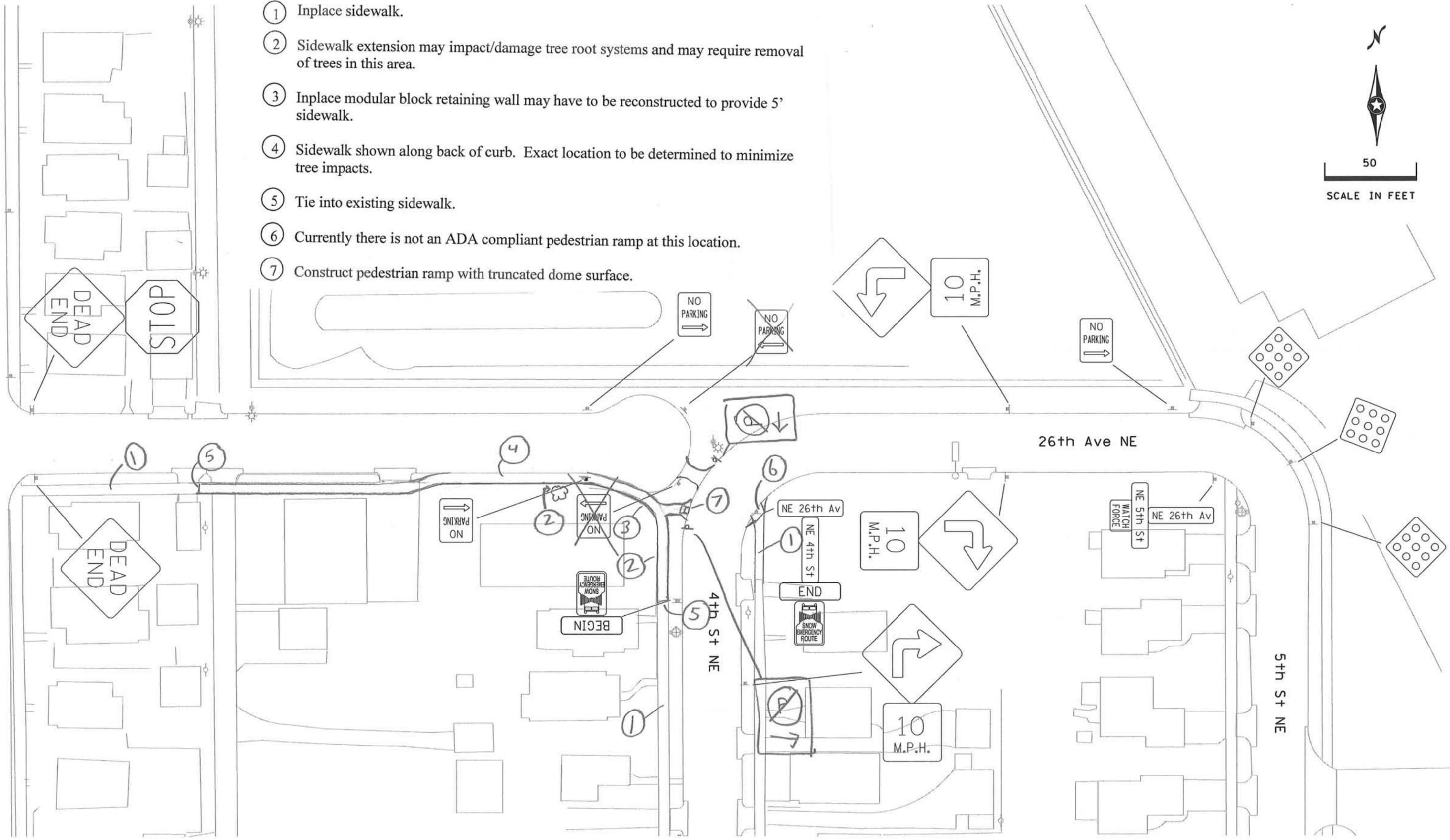
- ① Construct 10' trail east and north of existing alley/driveway.
- ② Install 1 additional wood pole light (Requires new pole and extension to overhead wiring).
- ③ Construct 10' curb depression.
- ④ Right-of-Way/easement acquisition may be needed.

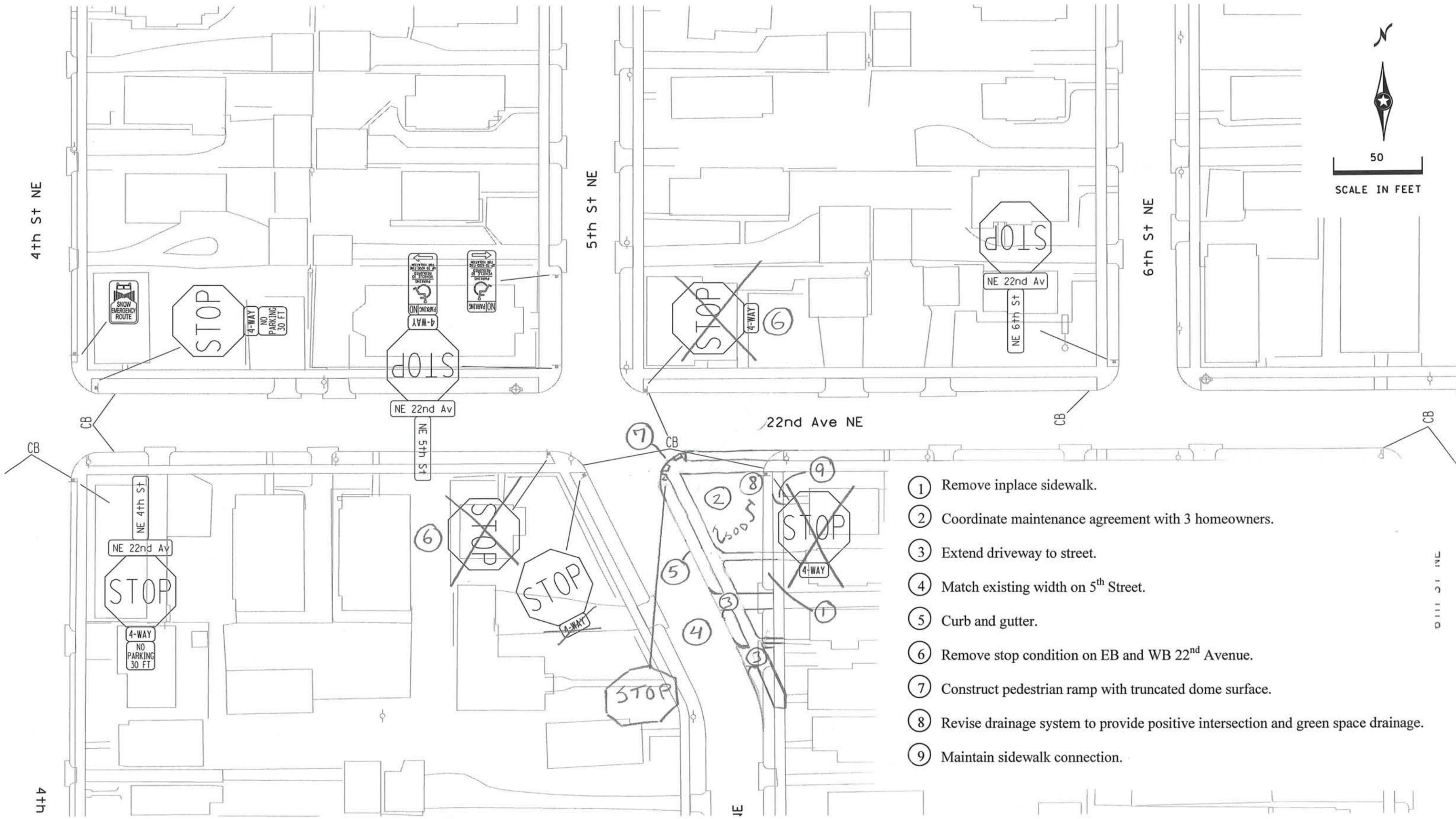




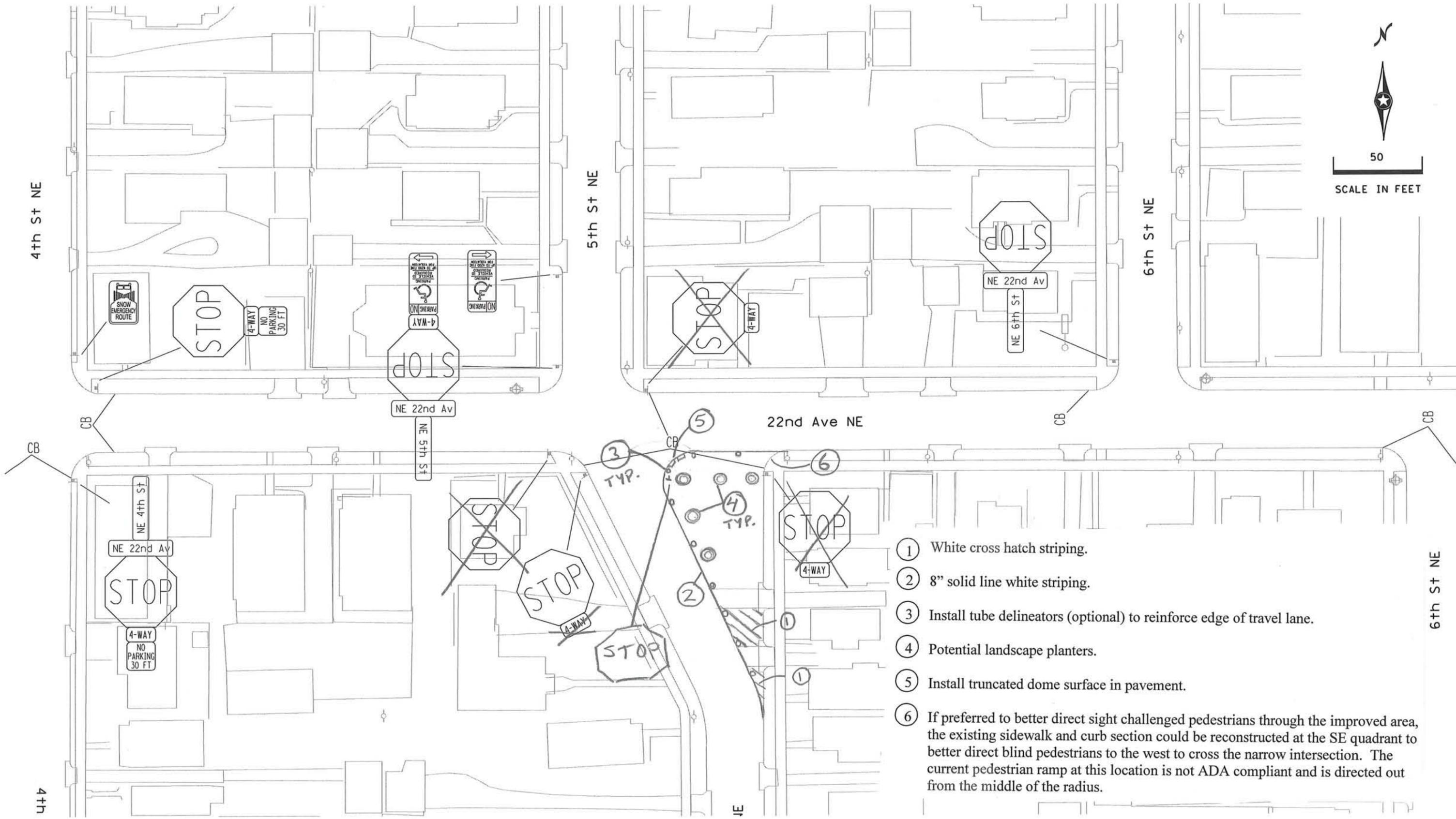
- ① Construct 6' wide bicycle pass-through.
- ② Construct curb and gutter with 3' radii tie in to existing.
- ③ Install No Parking Zone to provide clear sightlines of bicycle pass-through.

- ① Inplace sidewalk.
- ② Sidewalk extension may impact/damage tree root systems and may require removal of trees in this area.
- ③ Inplace modular block retaining wall may have to be reconstructed to provide 5' sidewalk.
- ④ Sidewalk shown along back of curb. Exact location to be determined to minimize tree impacts.
- ⑤ Tie into existing sidewalk.
- ⑥ Currently there is not an ADA compliant pedestrian ramp at this location.
- ⑦ Construct pedestrian ramp with truncated dome surface.





- ① Remove inplace sidewalk.
- ② Coordinate maintenance agreement with 3 homeowners.
- ③ Extend driveway to street.
- ④ Match existing width on 5<sup>th</sup> Street.
- ⑤ Curb and gutter.
- ⑥ Remove stop condition on EB and WB 22<sup>nd</sup> Avenue.
- ⑦ Construct pedestrian ramp with truncated dome surface.
- ⑧ Revise drainage system to provide positive intersection and green space drainage.
- ⑨ Maintain sidewalk connection.

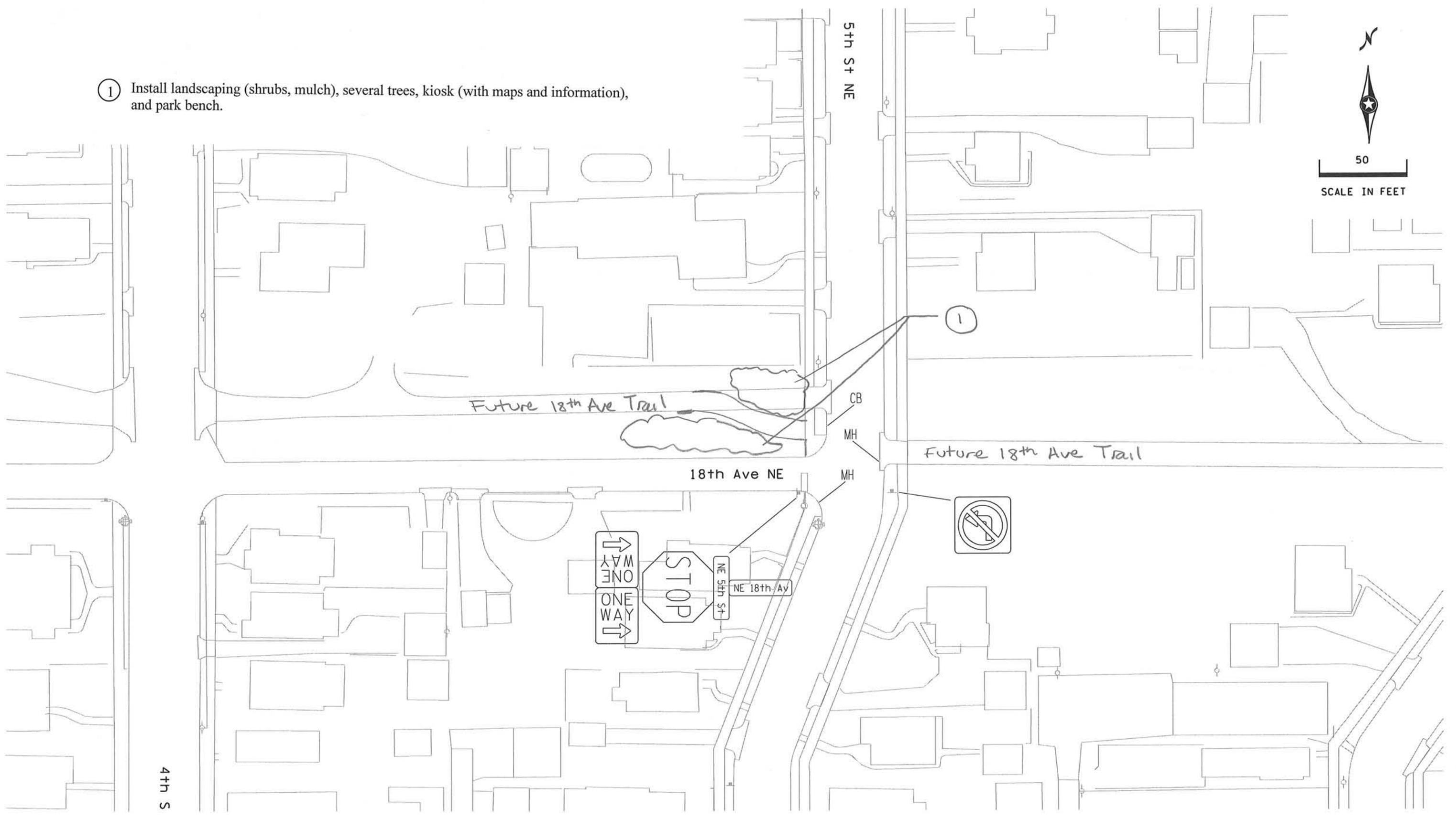


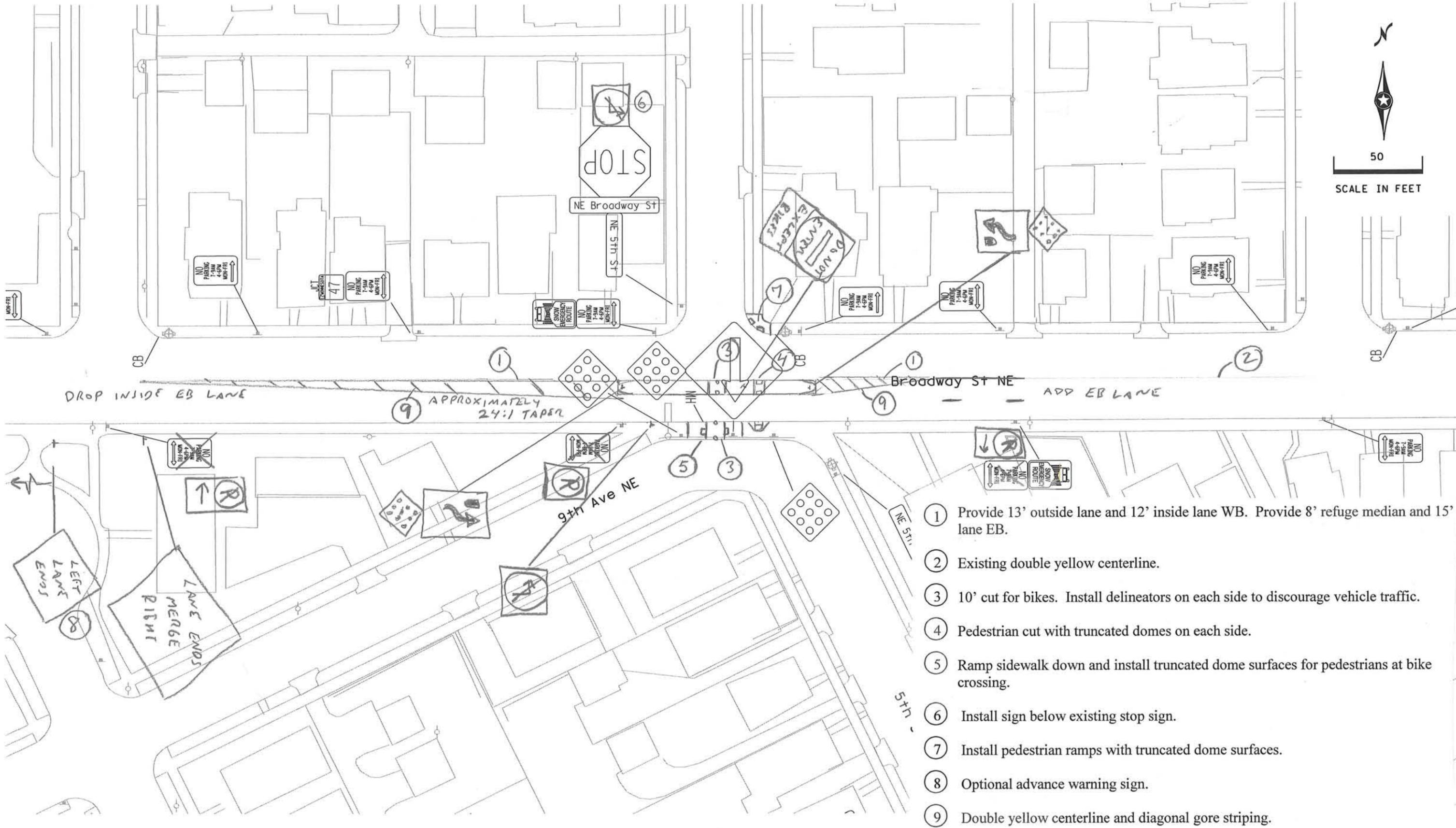
- ① White cross hatch striping.
- ② 8" solid line white striping.
- ③ Install tube delineators (optional) to reinforce edge of travel lane.
- ④ Potential landscape planters.
- ⑤ Install truncated dome surface in pavement.
- ⑥ If preferred to better direct sight challenged pedestrians through the improved area, the existing sidewalk and curb section could be reconstructed at the SE quadrant to better direct blind pedestrians to the west to cross the narrow intersection. The current pedestrian ramp at this location is not ADA compliant and is directed out from the middle of the radius.

- ① Install landscaping (shrubs, mulch), several trees, kiosk (with maps and information), and park bench.

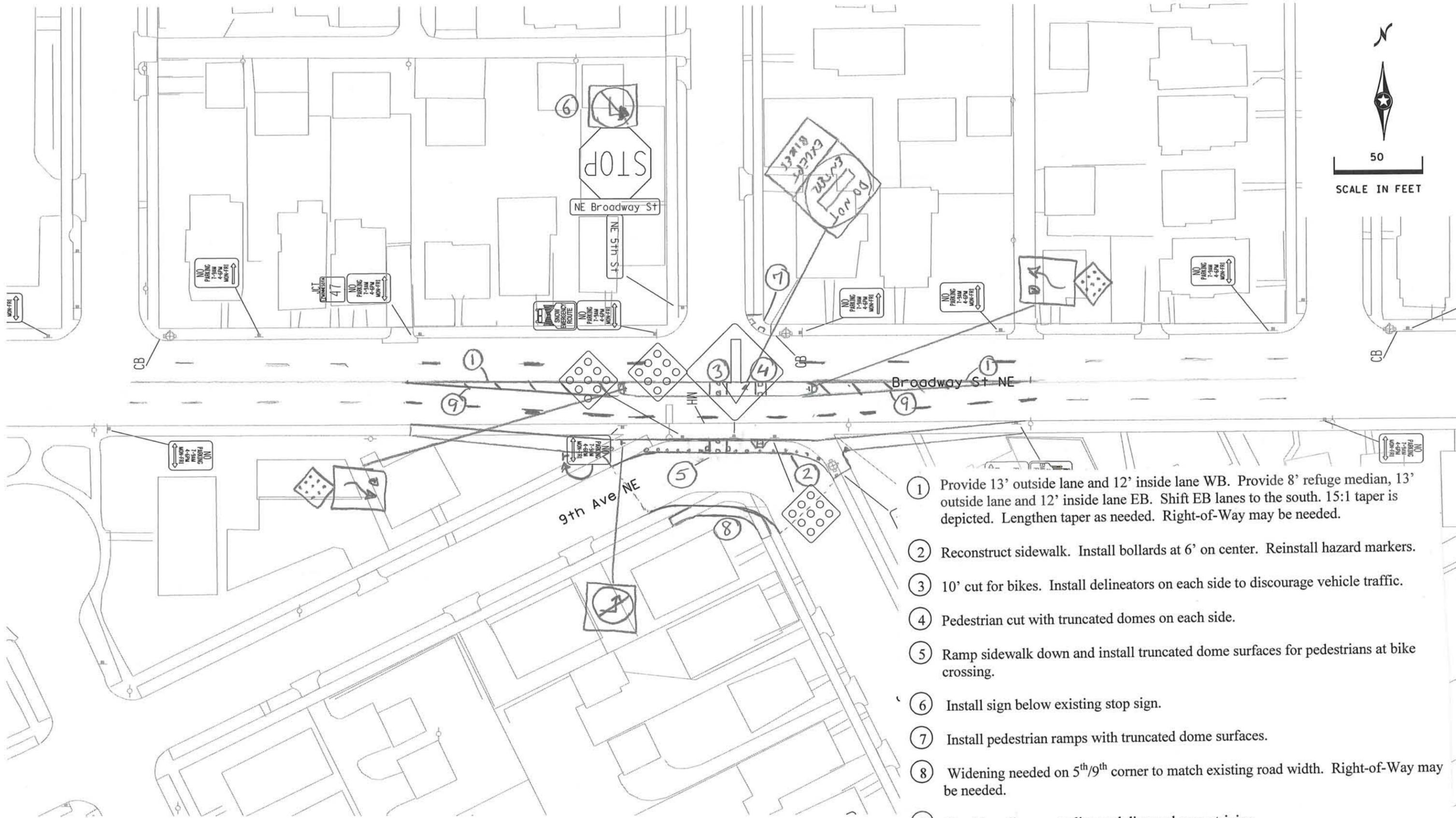


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SCALE IN FEET





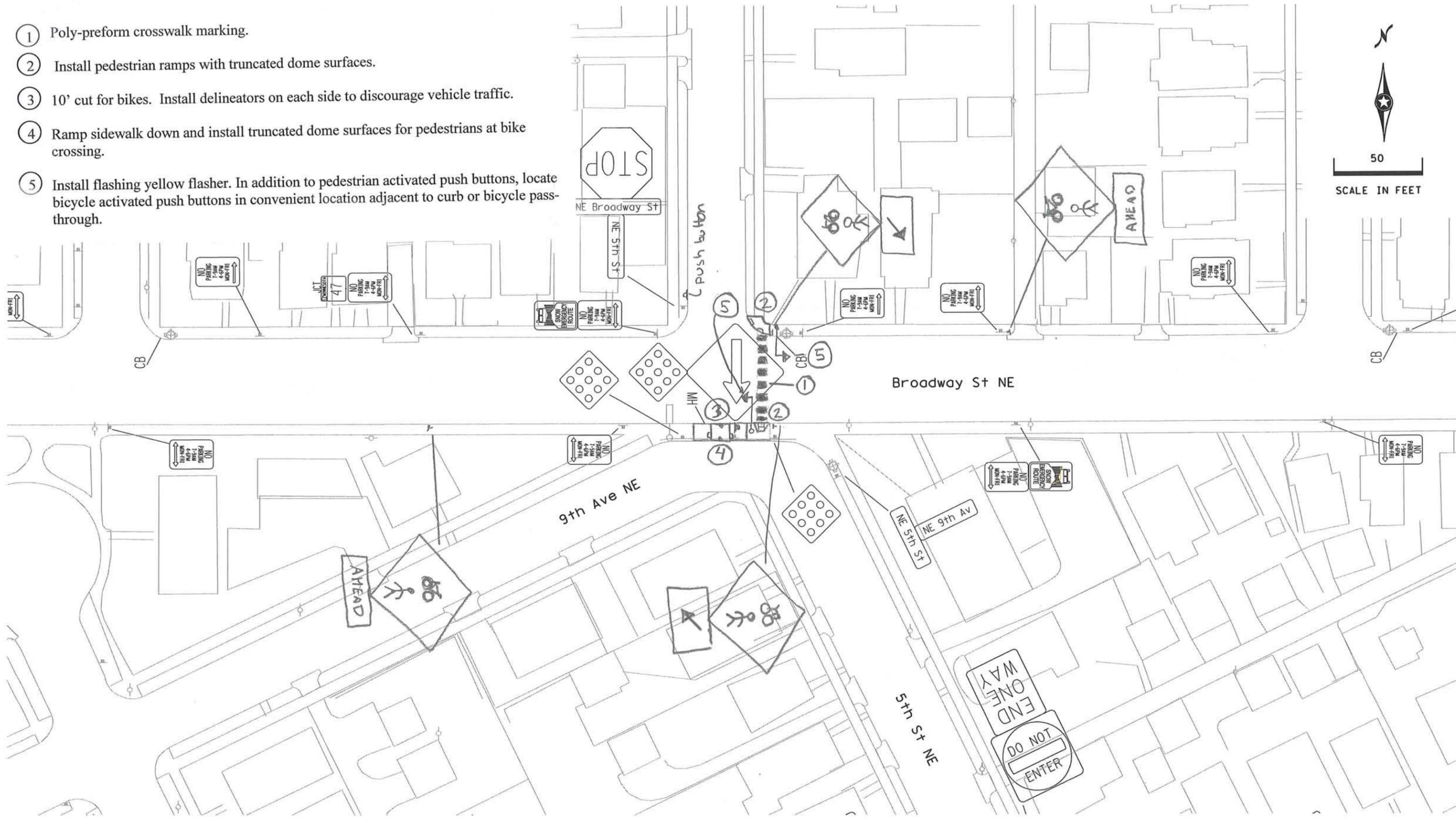
- ① Provide 13' outside lane and 12' inside lane WB. Provide 8' refuge median and 15' lane EB.
- ② Existing double yellow centerline.
- ③ 10' cut for bikes. Install delineators on each side to discourage vehicle traffic.
- ④ Pedestrian cut with truncated domes on each side.
- ⑤ Ramp sidewalk down and install truncated dome surfaces for pedestrians at bike crossing.
- ⑥ Install sign below existing stop sign.
- ⑦ Install pedestrian ramps with truncated dome surfaces.
- ⑧ Optional advance warning sign.
- ⑨ Double yellow centerline and diagonal gore striping.



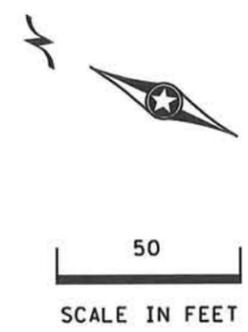
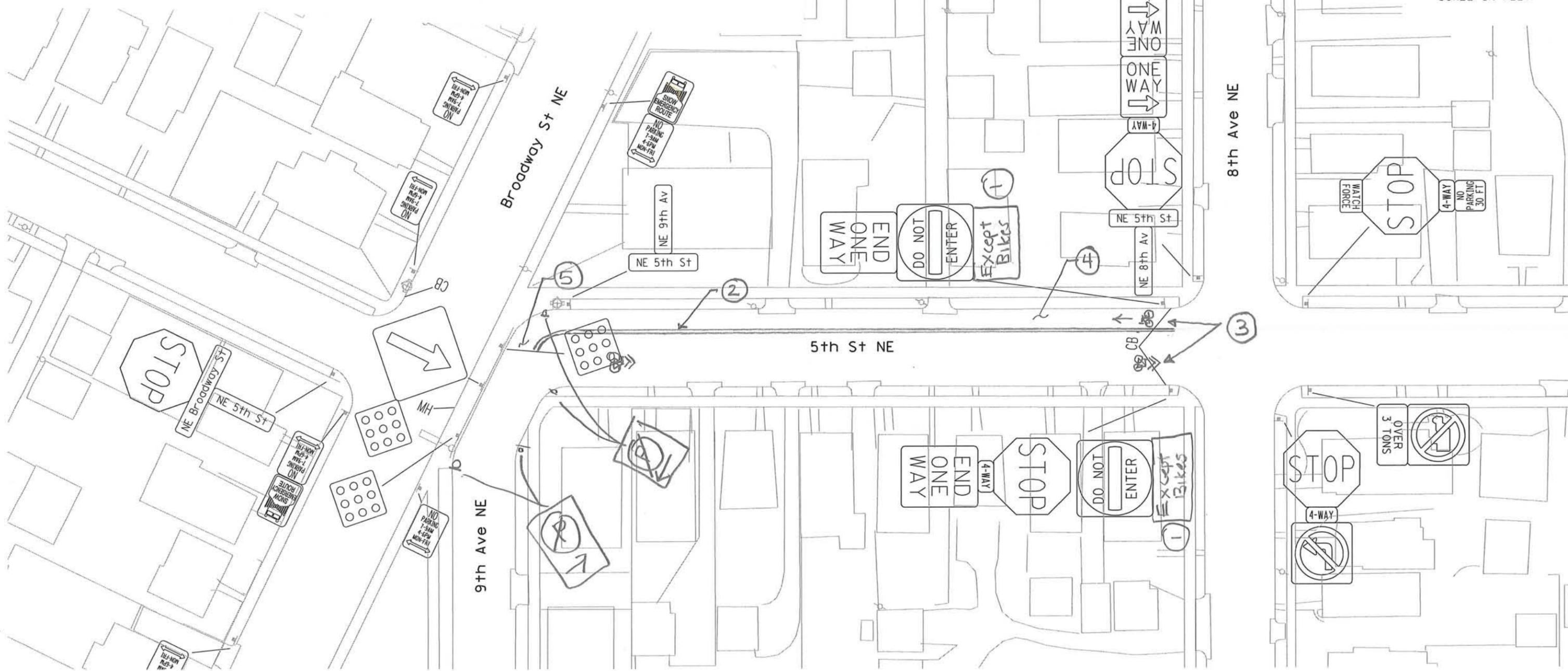
- ① Provide 13' outside lane and 12' inside lane WB. Provide 8' refuge median, 13' outside lane and 12' inside lane EB. Shift EB lanes to the south. 15:1 taper is depicted. Lengthen taper as needed. Right-of-Way may be needed.
- ② Reconstruct sidewalk. Install bollards at 6' on center. Reinstall hazard markers.
- ③ 10' cut for bikes. Install delineators on each side to discourage vehicle traffic.
- ④ Pedestrian cut with truncated domes on each side.
- ⑤ Ramp sidewalk down and install truncated dome surfaces for pedestrians at bike crossing.
- ⑥ Install sign below existing stop sign.
- ⑦ Install pedestrian ramps with truncated dome surfaces.
- ⑧ Widening needed on 5<sup>th</sup>/9<sup>th</sup> corner to match existing road width. Right-of-Way may be needed.
- ⑨ Double yellow centerline and diagonal gore striping.



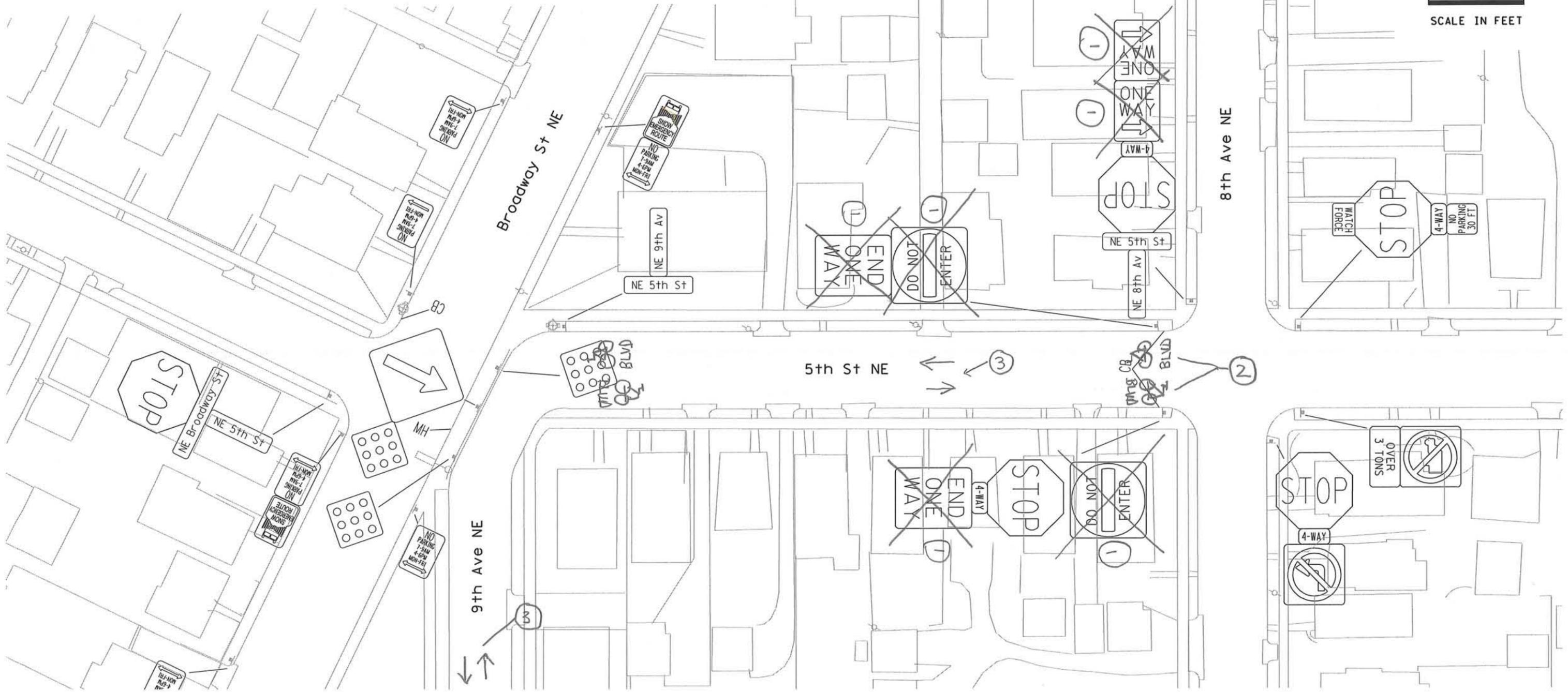
- ① Poly-preform crosswalk marking.
- ② Install pedestrian ramps with truncated dome surfaces.
- ③ 10' cut for bikes. Install delineators on each side to discourage vehicle traffic.
- ④ Ramp sidewalk down and install truncated dome surfaces for pedestrians at bike crossing.
- ⑤ Install flashing yellow flasher. In addition to pedestrian activated push buttons, locate bicycle activated push buttons in convenient location adjacent to curb or bicycle pass-through.



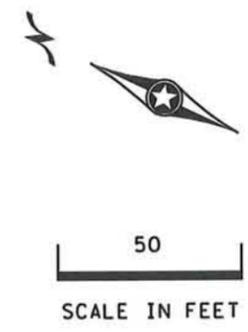
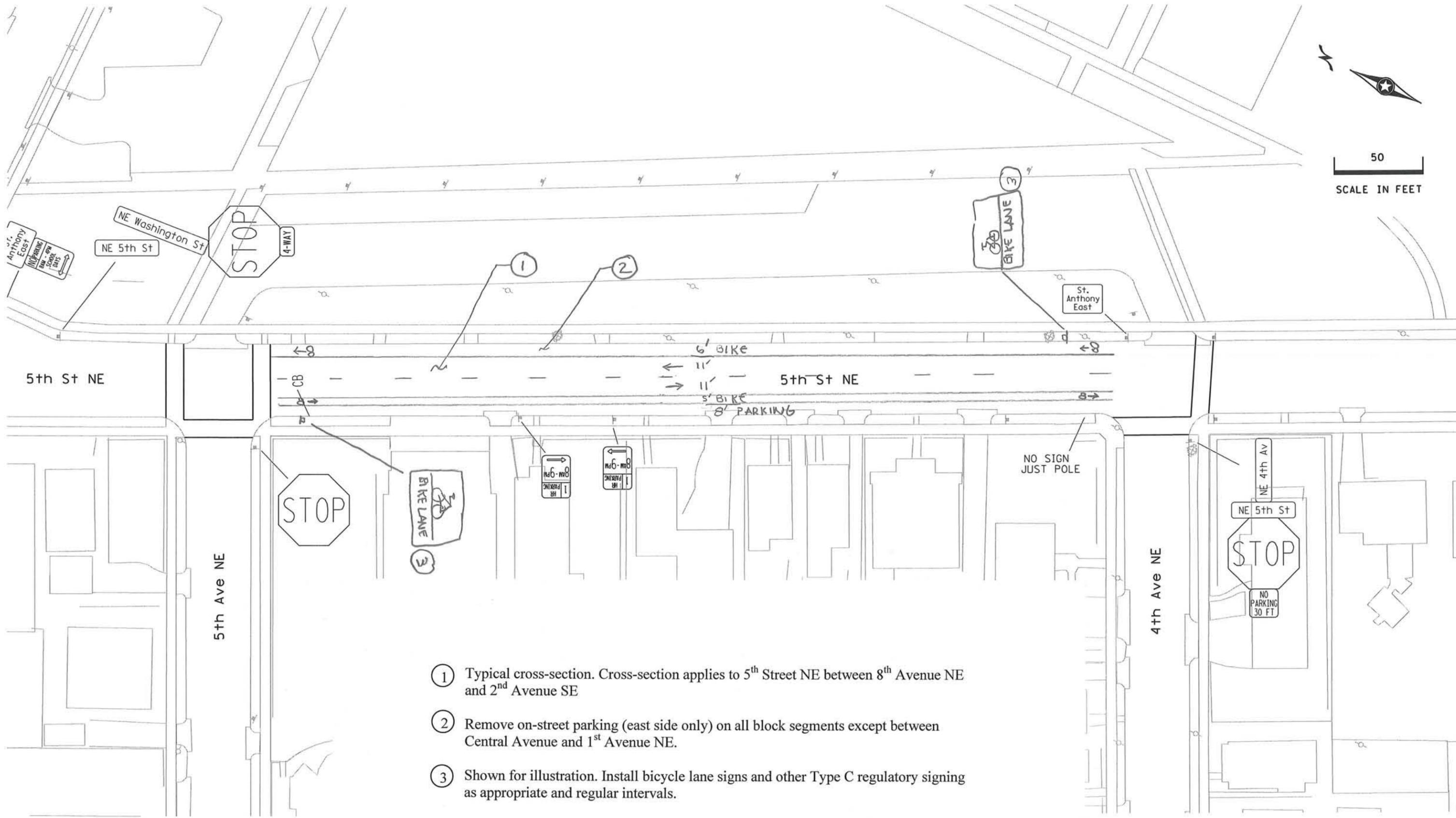
- ① Install "Except Bikes" plaque to permit bicycles in contraflow direction.
- ② Install double yellow center line
- ③ Install "sharrow" bicycle pavement marking in southbound direction and bicycle lane pavement marking in northbound direction.
- ④ Remove on-street parking entire length of block (east side only).
- ⑤ End contraflow lane at connection to 5<sup>th</sup> Street/Broadway Street connection.



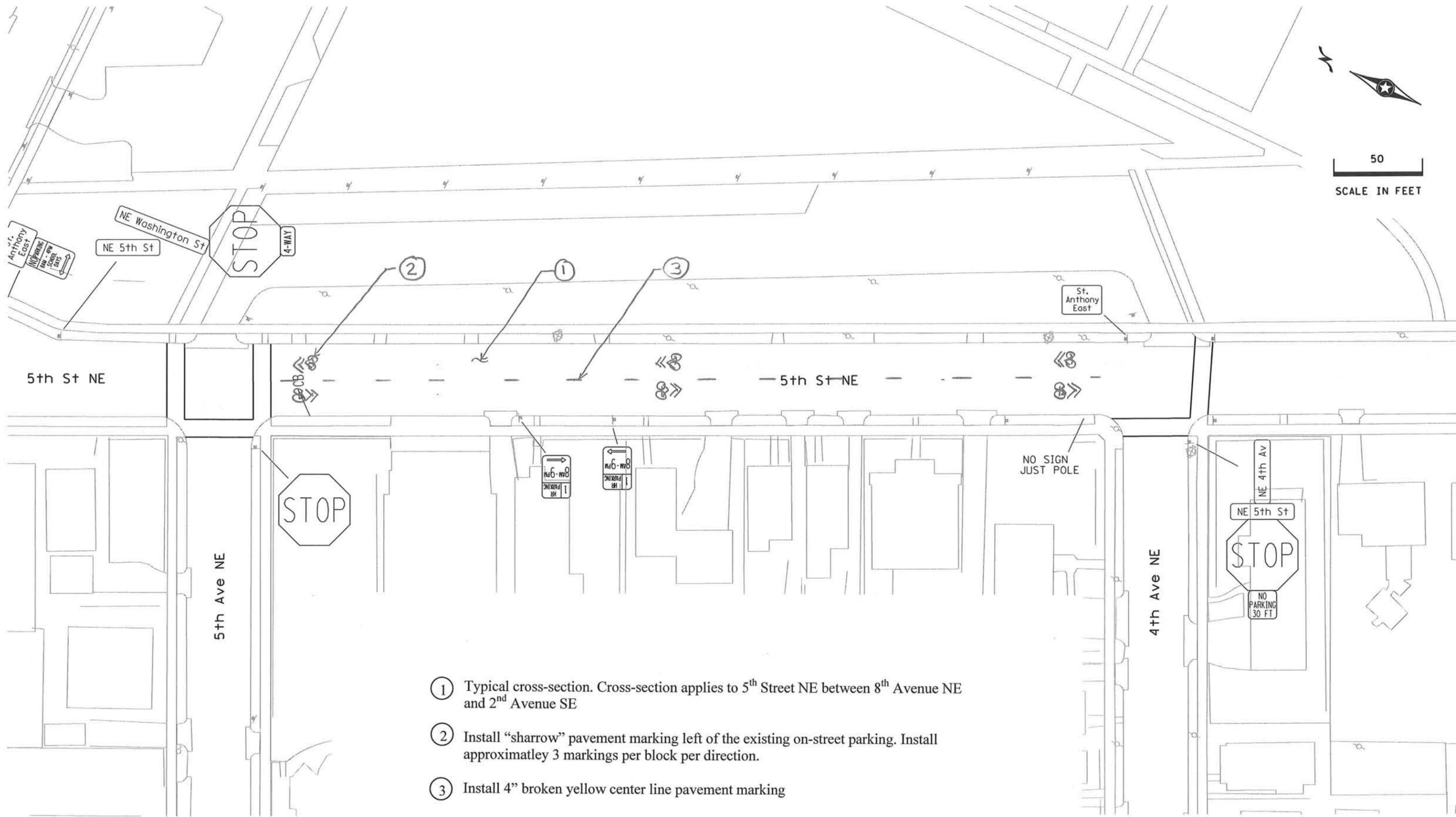
- ① Remove all associated one-way signing
- ② Provide bicycle boulevard pavement markings
- ③ Convert 5<sup>th</sup> Street, 9<sup>th</sup> Avenue and 4<sup>th</sup> Street to two-way traffic operation.



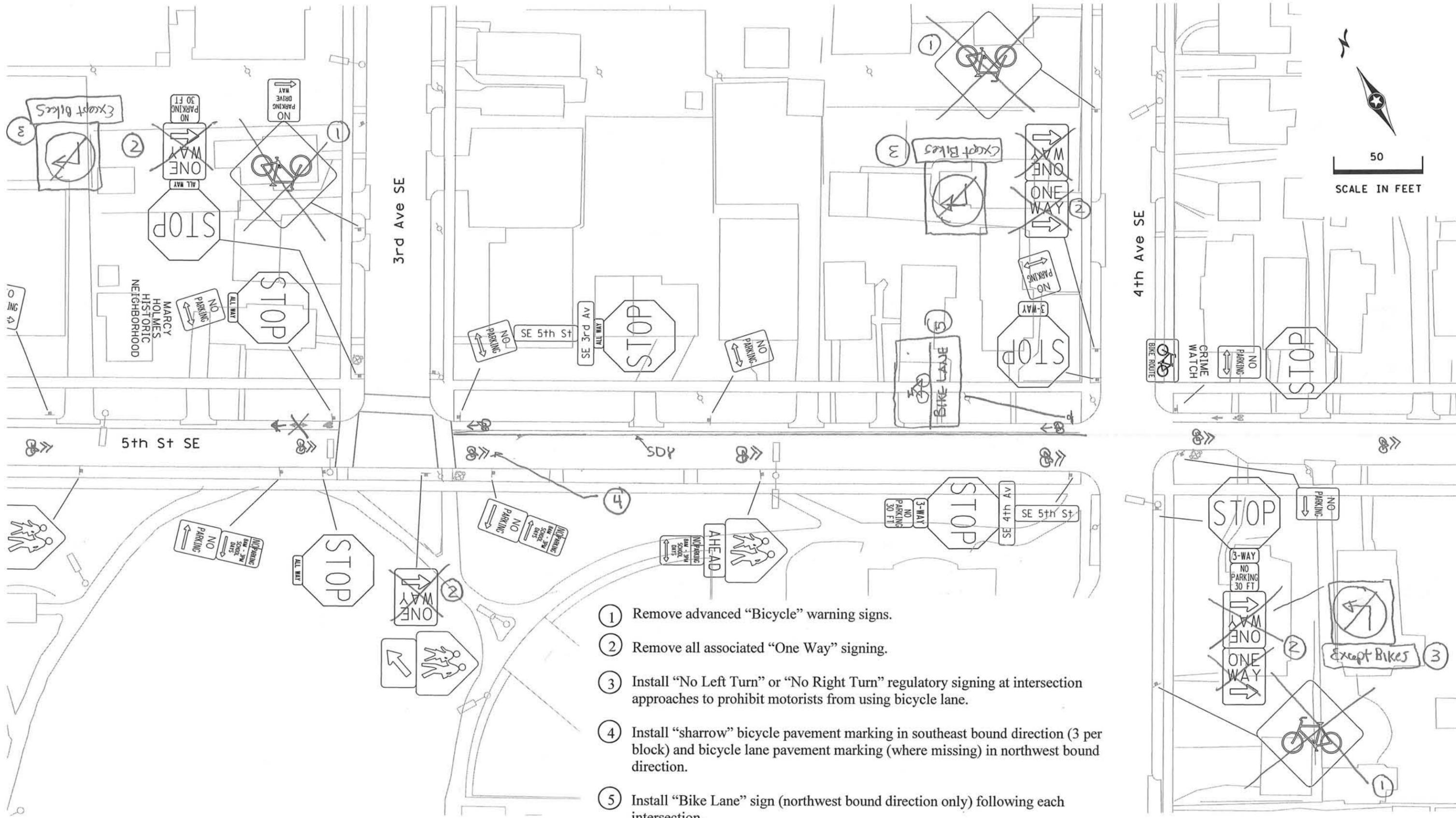




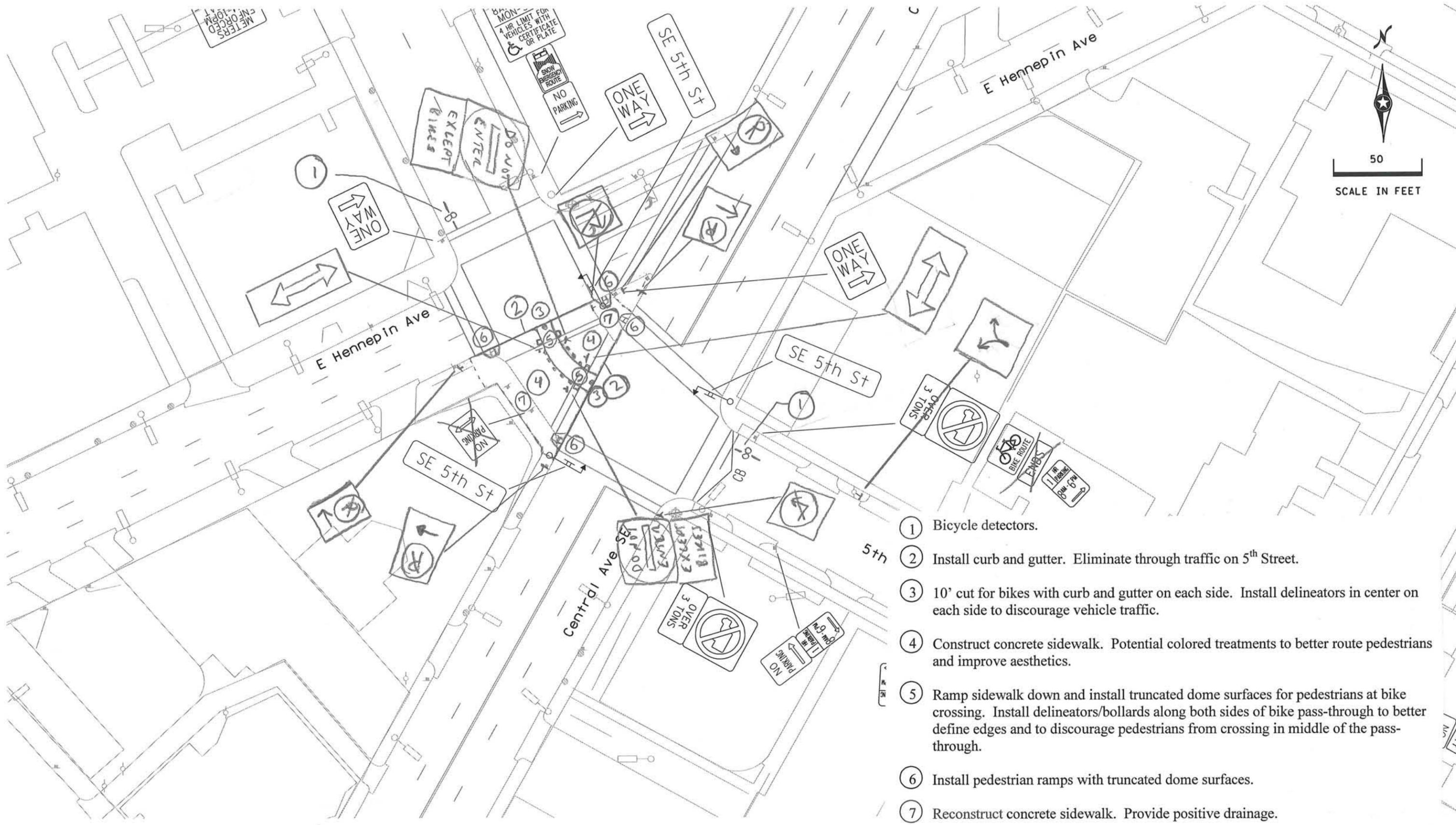
- ① Typical cross-section. Cross-section applies to 5<sup>th</sup> Street NE between 8<sup>th</sup> Avenue NE and 2<sup>nd</sup> Avenue SE
- ② Remove on-street parking (east side only) on all block segments except between Central Avenue and 1<sup>st</sup> Avenue NE.
- ③ Shown for illustration. Install bicycle lane signs and other Type C regulatory signing as appropriate and regular intervals.



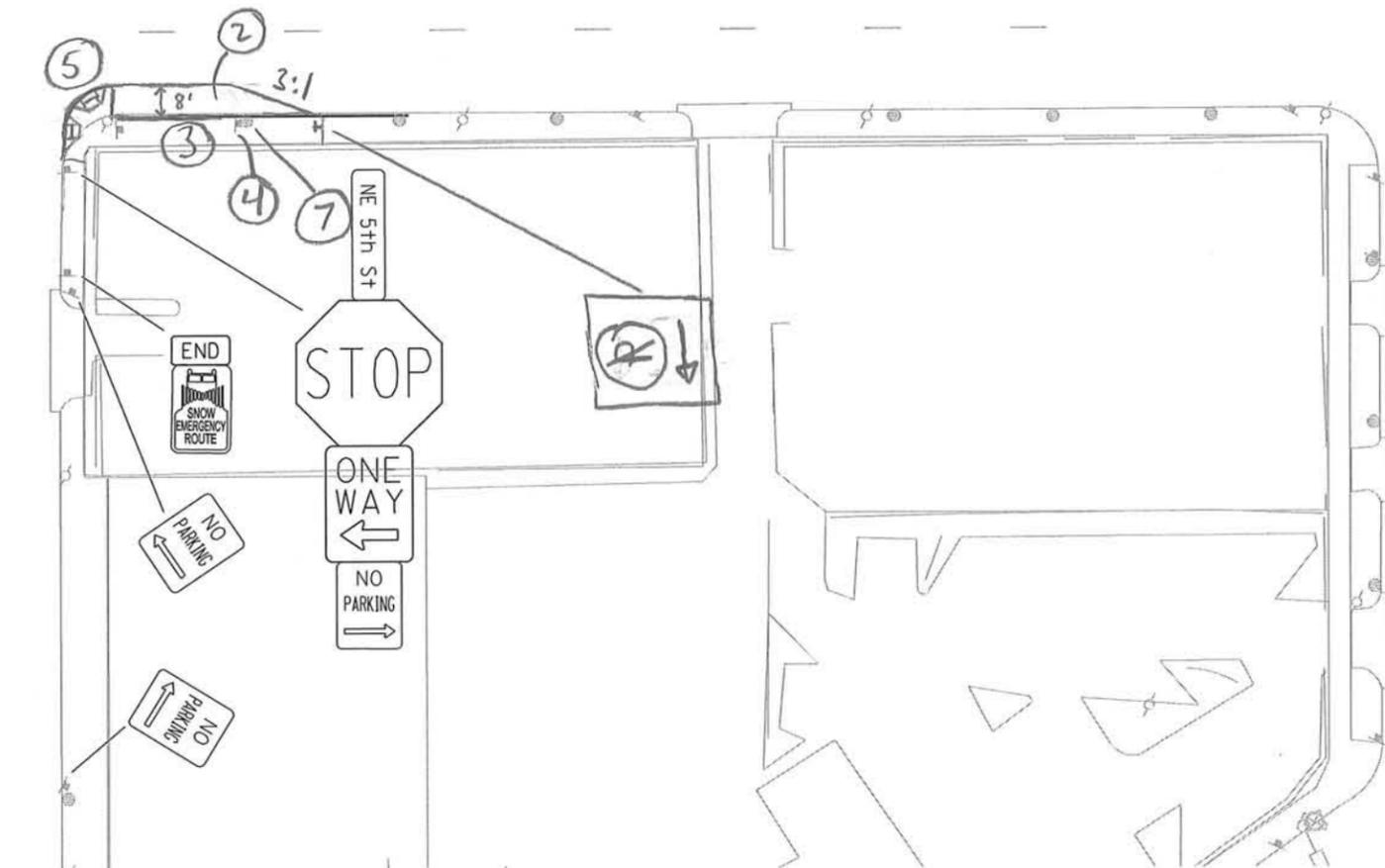
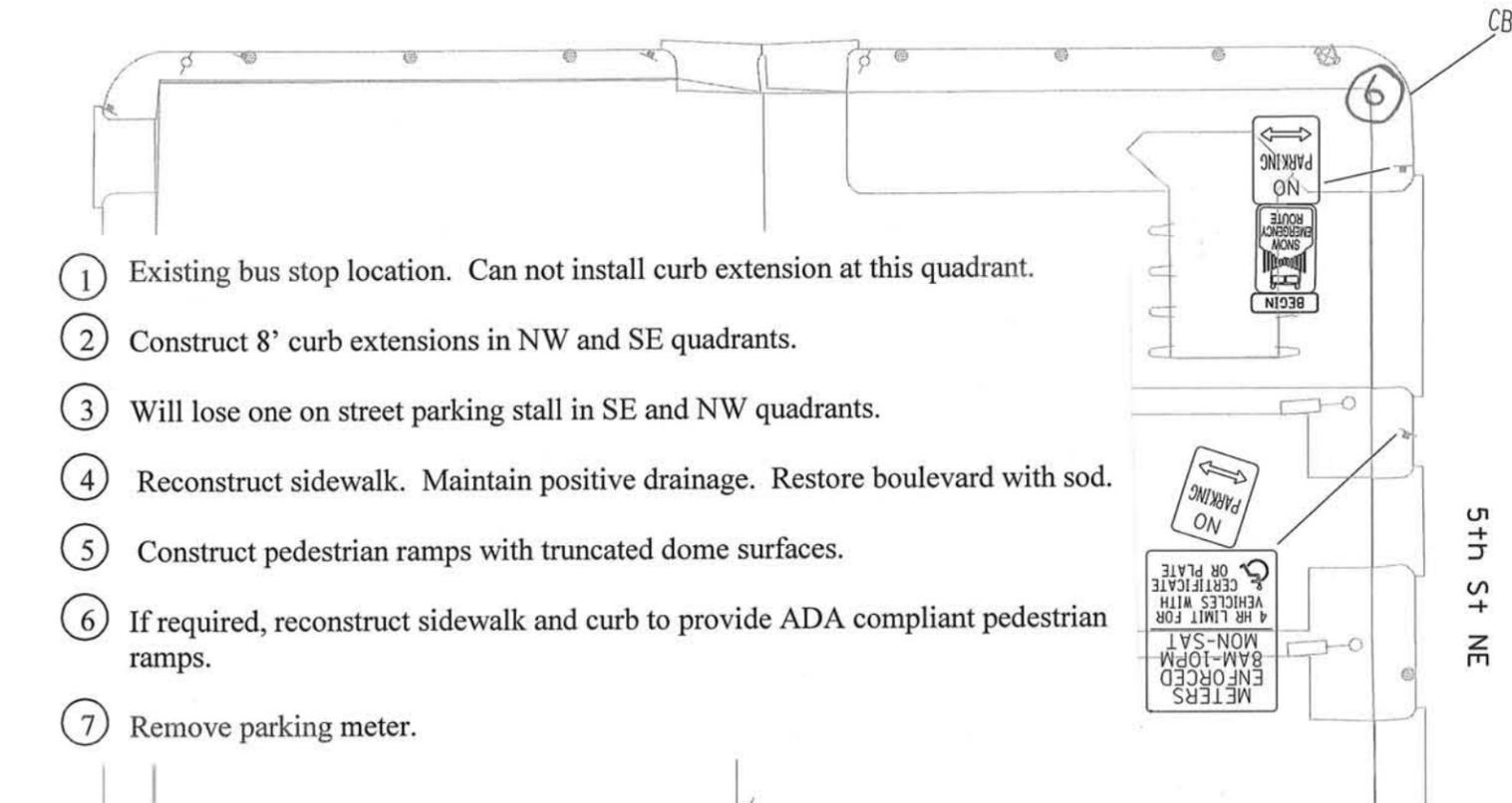
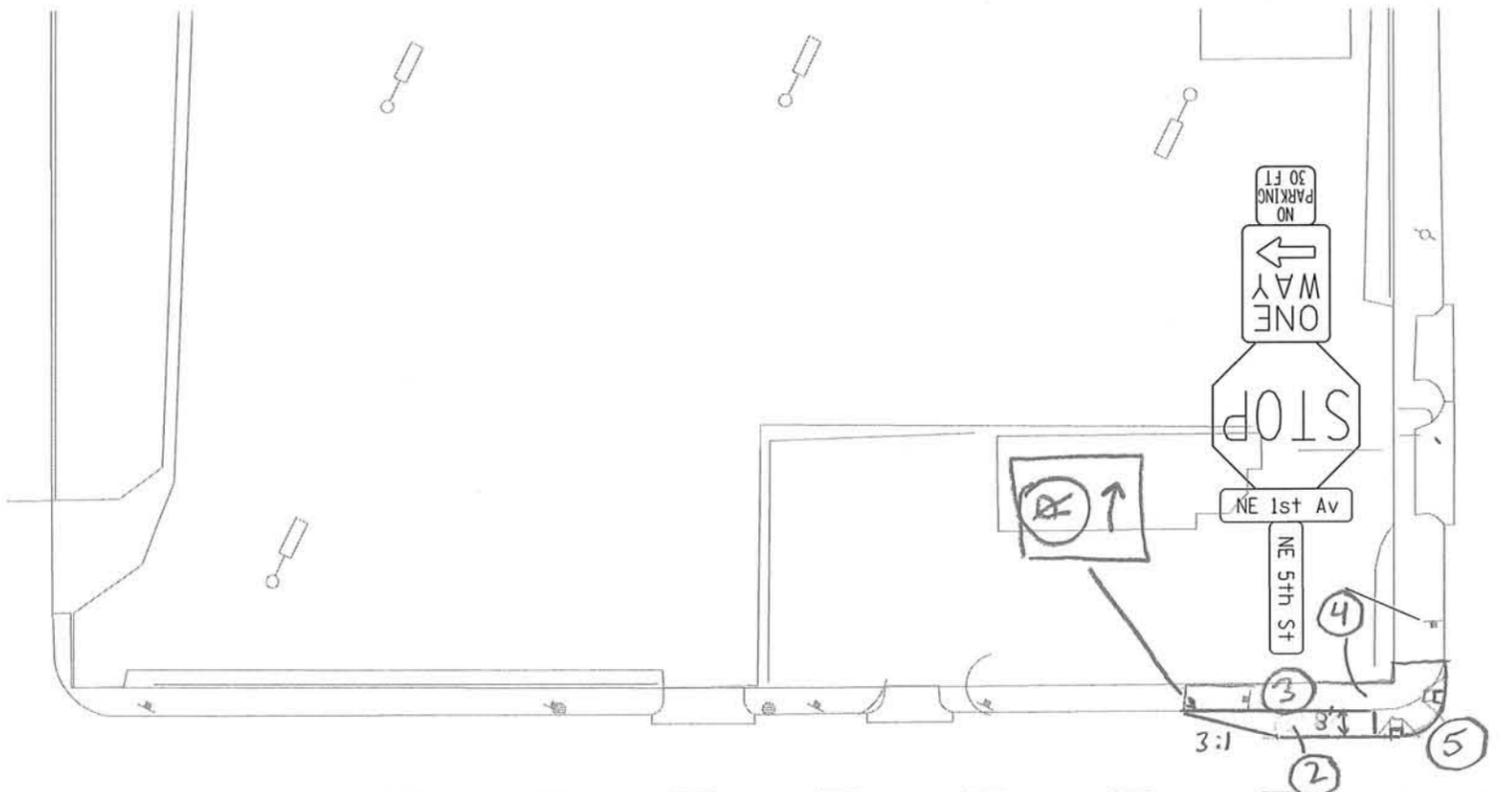
- ① Typical cross-section. Cross-section applies to 5<sup>th</sup> Street NE between 8<sup>th</sup> Avenue NE and 2<sup>nd</sup> Avenue SE
- ② Install “sharrow” pavement marking left of the existing on-street parking. Install approximately 3 markings per block per direction.
- ③ Install 4” broken yellow center line pavement marking



- ① Remove advanced "Bicycle" warning signs.
- ② Remove all associated "One Way" signing.
- ③ Install "No Left Turn" or "No Right Turn" regulatory signing at intersection approaches to prohibit motorists from using bicycle lane.
- ④ Install "sharrow" bicycle pavement marking in southeast bound direction (3 per block) and bicycle lane pavement marking (where missing) in northwest bound direction.
- ⑤ Install "Bike Lane" sign (northwest bound direction only) following each intersection.



- ① Bicycle detectors.
- ② Install curb and gutter. Eliminate through traffic on 5<sup>th</sup> Street.
- ③ 10' cut for bikes with curb and gutter on each side. Install delineators in center on each side to discourage vehicle traffic.
- ④ Construct concrete sidewalk. Potential colored treatments to better route pedestrians and improve aesthetics.
- ⑤ Ramp sidewalk down and install truncated dome surfaces for pedestrians at bike crossing. Install delineators/bollards along both sides of bike pass-through to better define edges and to discourage pedestrians from crossing in middle of the pass-through.
- ⑥ Install pedestrian ramps with truncated dome surfaces.
- ⑦ Reconstruct concrete sidewalk. Provide positive drainage.



- ① Existing bus stop location. Can not install curb extension at this quadrant.
- ② Construct 8' curb extensions in NW and SE quadrants.
- ③ Will lose one on street parking stall in SE and NW quadrants.
- ④ Reconstruct sidewalk. Maintain positive drainage. Restore boulevard with sod.
- ⑤ Construct pedestrian ramps with truncated dome surfaces.
- ⑥ If required, reconstruct sidewalk and curb to provide ADA compliant pedestrian ramps.
- ⑦ Remove parking meter.